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Learning from conflicts? The relations between task and relationship conflicts, team learning and team performance

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Learning from conflicts? The relations between task and relationship conflicts, team learning and team performance

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Team-based working has become a popular model of work organization. One of the expected yields of working in teams is collective learning. As team members work closely together they are likely to exchange information, which can enhance learning. One of the processes that may facilitate team learning is team conflict. In this study, 471 respondents, working in 84 teams in 38 organizations, indicated their perceptions of task conflict, relationship conflict, team learning, and their rating of the performance of the team. Task conflict was not related to team learning but was negatively related to the team members' rating of team performance. As was hypothesized, relationship conflict negatively affected team learning. Importantly, team learning was a strong predictor of the perceived team performance and partially mediated the relation between relationship conflict and performance.

Keywords: Team learning; Task conflict; Relationship conflict; Team performance.

Although empirical evidence does not consistently support the claim that teams enhance performance (Allen & Hecht, 2004), team-based working in organizations is increasingly the norm (De Dreu & Weingart, 2003). Many organizations adopt team-based structures in which teams are responsible

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for key organizational outputs (McDermott, 1999). Teams are thought to be more capable of increasing an organization's adaptability to dynamic environments than individuals working alone and teams are supposed to be more effective and lead to higher levels of worker satisfaction than hierarchical work organizations (Tjepkema, 2003). Moreover, teams are supposed to stimulate the stronger need for flexibility, quality consciousness, and innovation (Anderson & Michael, 1996; Lambert & Peppard, 1993) because they give space for creativity and problem-solving competences of team members.

One of the expected yields of team-based working is the stimulation of collective learning (Critchley & Casey, 1989; Edmondson, 1999; Katzenbach & Smith, 1993; Kofman & Senge, 1993; Senge, 1990). Teams bring together complementary skills and experience that exceed those of any individual on the team (Katzenbach & Smith, 1993). According to Senge (1990) teams, and not individuals, are the fundamental learning unit in modern organizations; "unless the team can learn, the organization cannot learn" (p. 40). We define the process of team learning in Huber's (1991) and van Offenbeek's (2001) terms as a change in the range of an entity's potential behaviours through the processing of information. In line with several other studies (Bunderson & Sutcliffe, 2003; Edmondson, 1999; van der Vegt & Bunderson, 2005; Van Offenbeek, 2001; Zellmer-Bruhn & Gibson, 2006) we expect a positive relationship between team learning and team performance.

When different team members bring different types of information and expertise to a problem, some degree of disagreement is both inevitable and desirable, as this creates an opportunity to dig deeper and seek not only consensus, but creative third ways that were not visible before (Burson, 2002). However, conflicts can also easily harm informal relationships between workers. Therefore, it can be expected that task conflicts (Jehn, 1995) that are caused by different opinions regarding the tasks being performed will stimulate team learning whereas relationship conflicts among team members will harm team learning.

Although the effects of conflict on group performance have been studied and discussed extensively (De Dreu & Weingart, 2003; Stock, 2004), the relationship between conflict and learning has not been fully developed (Moye & Langfred, 2004). Many authors on organizational learning stress the importance of the role that conflict can play in team learning or organizational learning (Argyris & Schön, 1996; Senge, 1990; Swieringa & Wierdsma, 1992; van den Bossche, Gijssels, Segers, & Kirschner, 2006), but the different relationships that task and relationship conflicts may have with the process of team learning are underexplored. Therefore, the objective of this study was to determine the relationship between task conflicts, relationship conflicts, team learning, and team performance. In the following, we will first address the concept of team learning. Next we will

argue that different types of conflict relate differently to team learning and we will explain the relationship between team learning and performance.

WHAT IS TEAM LEARNING?

Learning can be conceived of as a change in the range of an entity's potential behaviours through the processing of information (Huber, 1991). Just like individual learners, teams have to attend to, encode, store, and retrieve information that exists in the surrounding environment. The core issue in team learning is that in team contexts, people can learn not just from their own direct experiences, but also from the experience of other team members also indicated as learning from secondary or indirect experience (Ickes & Gonzalez, 1994; Jarvis, 1995). Teams can process information not only within, but also between the minds of the team members (Ickes & Gonzalez, 1994). Because team members can interact with one another, knowledge and skills gathered by one team member can be transferred to team members by giving feedback, explanation, or advice (Ellis et al., 2003).

Information exchange between team members brings sources of knowledge together and manipulates it into new knowledge structures or routines (Clark, Amundsen, & Cardy, 2002). In the definition of Huber (1991) and van Offenbeek (2001), team learning includes the processes of information acquisition, information distribution, information interpretation, and information storage and retrieval. Information acquisition refers to the process by which information is obtained by passive scanning or actively initiating inquiries in the internal and external environment. Information distribution is the process by which team members distribute information to the other team members. The information interpretation process refers to the dialogue in which distributed information is given interpretations that are commonly understood by the team. Information interpretation consists of convergent sensemaking leading to collective interpretations, and divergent sensemaking, leading to the transformation of interpretations. The process of information storage and retrieval refers to the storage of common information and locating and using information in the future.

THE RELATIONSHIP BETWEEN TASK AND RELATIONSHIP CONFLICTS AND TEAM LEARNING

Effective information sharing in teams may not always proceed without conflict. Conflict is generally a disagreement regarding interests or ideas. Task conflicts are differences of opinion on aspects of the task, whereas relationship conflicts refer to personal tensions in which negative emotions like irritation, frustration, and anger play an important role (Jehn, 1995). Several studies (Pelled, Eisenhardt, & Xin, 1999; Schwenk, 1990) show a

positive effect from task conflicts on cognitive achievement. Facile and uncritical agreement within the team can have a negative influence on problem solving (Aldag & Fuller, 1993; Janis, 1985), whereas task conflict forces individuals to think more deeply and more creatively about the problem they have to solve. This fosters learning and the development of new and creative insights, making the group more effective and innovative (De Dreu & Weingart, 2003). Especially in creative tasks or in typical learning situations characterized by a high information load and ambiguity, diversity in attitude towards the task is important to learning (Fiol, 1994). Van Offenbeek (2001) finds that the more divergent the ideas about the task at the start, the more the team experienced to have learned at the end. The literature on conflicts and learning thus lead us to the following hypothesis

Hypothesis 1: Task conflicts are positively related to team learning.

Relationship conflicts may result in a neutral effect on problem solving when conflicts have no direct relationship to the task (Pelled et al., 1999) or a dysfunctional effect (Jehn, 1994) when conflicts disturb the trust and openness in the team climate. Although we found no studies that investigated the relationship between relationship conflict and team learning, it is likely that relationship conflict limits the information processing ability of the group because group members spend their time and energy focusing on each other rather than on the group's task-related problems (De Dreu & Weingart, 2003) and conflict-related stress and emotions prohibit straight and analytic thinking (Jehn & Bendersky, 2003; Wall & Callister, 1995). Furthermore, in a sample of teams in the recruitment, selection and assessment service, De Dreu (2006) found a negative relationship between relationship conflict and collaborative problem solving and goal attainment. Therefore we hypothesize that:

Hypothesis 2: Relationship conflicts are negatively related to team learning.

TEAM LEARNING AND PERFORMANCE

Since nowadays many teams face change or uncertainty, teams must engage in learning behaviour to understand their environment and their customers and to coordinate members' actions effectively (Edmondson, 1999). But also teams performing routine tasks need to learn to ensure effective self-management and process improvement (Edmondson, 1999). By learning, teams can make relatively permanent changes in their collective level of knowledge and skills produced by the shared experience of the team members. This enables teams to adapt to changing circumstances, to improve their way of working and to solve new problems, which will finally

result in a better team performance. However, although for the past decade practitioners have advocated the importance of team learning to organizational effectiveness, research has only begun to examine the empirical relationship between team learning and team performance (Druskat & Kayes, 2000). Several authors (Edmondson, 1999; Edmondson, Bohmer, & Pisano, 2001; van der Vegt & Bunderson, 2005; Zellmer-Bruhn & Gibson, 2006) show that learning behaviour in teams is positively associated with team performance. Bunderson and Sutcliffe's (2003) study of management teams showed that an appropriate emphasis on learning has positive consequences for team effectiveness. In line with the findings in the studies already mentioned, we formulate our third hypothesis as follows:

Hypothesis 3: Team learning is positively related to team performance.

CONFLICT AND PERFORMANCE

Relationship conflict decreases communication, cooperation, and understanding among team members (Jehn & Bendersky, 2003) leading to a decrease in team performance. The recent meta-analysis from De Dreu and Weingart (2003) shows an overall negative relationship between relationship conflict and performance of $-.22$. The theorized relation between task conflict and performance is less clear. On the one hand task conflict may increase team members' tendency to scrutinize task issues and to engage in deep and deliberate processing of task-relevant information, resulting in better team performance. On the other hand, task conflicts may also result in an increase in cognitive load leading to a decrease in team performance. Some studies report positive effects of task conflict on performance (Jehn, 1994, 1995; Jehn & Mannix, 2001); other studies find negative effects (Jehn, Northcraft, & Neale, 1999; Lovelace, Shapiro, & Weingart, 2001; Thatcher, Jehn, & Zanutto, 2003) or no significant effects (Kurtzberg, 2000; Pelled et al., 1999). However, since the recent meta analysis of De Dreu and Weingart (2003) has shown that in general task conflict is detrimental to team performance (with an overall effect size of $-.23$), we hypothesize that:

Hypothesis 4a: Task conflict is negatively related to team performance.

Hypothesis 4b: Relationship conflict is negatively related to performance.

TEAM LEARNING AS A MEDIATOR OF THE RELATIONSHIP BETWEEN CONFLICT AND PERFORMANCE

We expect that team learning is an intermediate variable in the relationship between task conflicts and relationship conflicts on the one hand, and team

performance on the other hand. Although the direct relationship between task conflict and team performance will be negative, task conflict will be positively related to team learning (Hypothesis 1) and team learning, in turn, will be positively related to team performance (Hypothesis 3), suggesting a positive indirect relationship between task conflict and team performance through the mediation of team learning. The overall relationship between task conflict and team performance will thus depend on what relationship will be stronger, the direct negative relationship between task conflict and team performance or the mediated positive relationship via team learning. Furthermore, we argue that the relation between relationship conflict and performance is partially mediated by team learning; when relationship conflicts emerge, the team learning process will get stifled, which will lead to a deterioration of the team performance.

The relationship between task conflict and performance will only be partially mediated by team learning, as it is likely that other variables that are not considered in this study (such as commitment to decisions; Greenberg & Folger, 1983) can also play a mediating role in this relationship. Similarly, the relation between relationship conflict and performance will only be partially mediated by team learning since variables like distraction, misspent time, and effort and group focus (Jehn & Bendersky, 2003) may also mediate this relationship. Therefore, we hypothesize that:

Hypothesis 5a: The relation between task conflicts and team performance is partially mediated by team learning, so that task conflict is positively related to team learning, and the latter is positively related to team performance.

Hypothesis 5b: The relation between relationship conflicts and team performance is partially mediated by team learning, so that relationship conflict is negatively related to team learning, and the latter is positively related to team performance.

Figure 1 presents a summary of our conceptual model and the formulated hypotheses.

METHOD

Participants and design

We employed a cross-sectional design in which we sampled teams from a wide range of organizations in both the public sector (healthcare, education, police); and the private sector (retail, banks, food industry, administration). Although our sample consisted of a diversity of teams, all respondents were participants in ongoing teams with a long task duration (Bradley, White, & Mennecke,

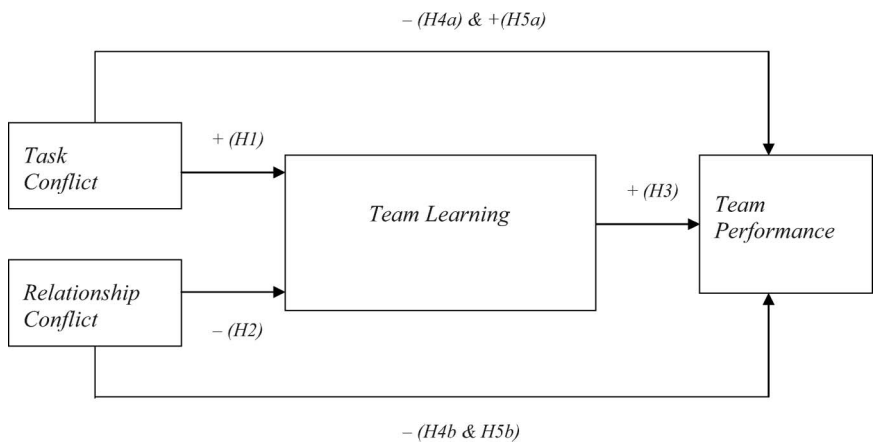


Figure 1. Conceptual model.

2003) in which team members work together regularly for an extended period of time and also expect to work together in the future. Although there is no consensus in the literature about what constitutes a “real team” (see, for instance, Hackman, 2002; Kozlowski & Bell, 2003; West, Borrill, & Unsworth, 1998), the teams in our sample were real teams according to the definition of Wageman, Hackman, and Lehman (2005) since (1) the teams as a whole would be held responsible for the performance of the overall task, (2) the teams had clear boundaries to distinguish members from nonmembers, and (3) there was at least moderate stability of team membership. The information about the real team characteristics was provided to us by our contact person in the organization (usually a manager or an HR manager).

Questionnaires were distributed to a total of 1080 respondents. The overall response rate was 48.79%. The percentage of missing values on the items of the different subscales ranged between 0% and 2.3%. Five respondents were removed because they had not completed the conflict scales, five respondents were removed because they had not completed the perceived team performance scale, and 46 respondents were eliminated from further analyses because they were members of teams larger than 40 members. Since large teams tend to segment into subgroups (Kratzer, Leenders, & van Engelen, 2004), we chose for a cutoff point a team size of 40 members.¹ Since this cutoff point is quite arbitrary, we decided to control for team size in our analyses. The final sample consisted of 471 respondents from 84 teams in 38 organizations. Healthcare teams were over represented

¹The large teams of 30–40 members were all part of healthcare organizations in which team members would usually work in smaller subsets of the team depending on the shift they would be working in.

with 54 teams (10 hospital units, 14 allied health teams, 24 nursing institutions, 3 home-care teams, and 3 mental healthcare teams, in total 63% of the respondents). Apart from the healthcare teams there were (military) police teams (9 teams, 36 respondents), fast food and retail teams (8 teams, 45 respondents), banking, administration and consultancy teams (5 teams, 28 respondents), manufacturing teams (6 teams, 38 respondents), and two teams of primary school teachers (29 respondents). Consequently, there were fewer men in our sample than women: 27% of the respondents were male; the mean age was 38.9 years old ($SD = 10.88$). Of our respondents, 33% held a Bachelor degree or higher, 57% held a vocational education degree, and 7% had lower educational levels. The average experience of individuals working in the team was 6.44 years. Team size varied from 3 to 40 members with an average of 15 members per team.

Instruments

Participants were asked to indicate the extent to which they experienced task and relationship conflict within their team, their perception of team learning, and how well their team performed. Unless otherwise stated, we assessed all variables by questionnaire items with a response scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"). Random missing data on items of each scale were replaced by imputation of regression estimates with added error components, controlled for team, organization, gender, age, and educational level (Little & Rubin, 1990). Means, standard deviations, and internal reliability statistics (Cronbach's alpha) are presented in Table 1.

Task and relationship conflict. Task conflict and relationship conflict were measured by 11 items of a translation and elaboration of the Intragroup Conflict Scale (Jehn, 1994) by Janssen, Veenstra, and van de Vliert (1994). We tested the hypothesized two-factor structure of the conflict measure, with the first factor representing task conflict and the second one reflecting relationship conflict in the total research sample ($N = 471$) using Confirmatory Factor Analysis (CFA; Jöreskog & Sörbom, 1996). Since we had ordinal variables we analysed the matrix of polychoric correlations with the WLS method (Jöreskog & Sörbom, 1996). The first CFA with two factors representing task conflict and relationship conflict did not account well for the data, $\chi^2(43, N = 471) = 1122.85$, $p < .001$ (GFI = .85, NNFI = .79, RMSEA = .23,

²We also explored whether a curvilinear relation exists between task conflict and team learning (cf. De Dreu, 2006). We computed the squared term for task conflict and entered this additional term in the regression analyses predicting team learning (e.g., De Dreu, 2006, Jehn, 1995). Adding the squared term to Step 2 in Table 2 did not yield an improvement of fit (R^2 change = .002, *ns*), thus no curvilinear relationship exists.

TABLE 1
Descriptive statistics (individual level) and correlations between variables (team level)

Variables	<i>N</i> items	Mean	<i>SD</i>	1.	2.	3.	4.	5	6.	7.	8.
1. Team performance	5	5.48	0.53	(.68)							
2. Task conflict	4	2.80	.43	-.25*	(.74)						
3. Relationship conflict	4	2.29	0.58	-.32**	-.55**	(.80)					
4. Team learning	26	4.32	0.94	.44**	-.22*	-.55**	(.97)				
5. Gender ratio ^a		0.72	0.37	.08	-.12	-.16	.49**				
6. Average age		38.82	6.47	.06	.05	-.20	.14	-.03			
7. Average education		3.33	0.62	-.01	.01	-.01	.22*	.10	.04		
8. Average years in team		6.02	3.96	-.04	.07	-.04	.05	-.07	-.39**	-.10	
9. Team size		13.01	8.73	-.29**	.15	.13	.03	.20	-.02	-.02	.16

*** $p < .001$, ** $p < .01$, * $p < .05$. $N = 84$, ^a0 = all male, 1 = all female. Diagonal: Cronbach's alpha.

CFI = .83). However, removing three items on the basis of a combination between low factor loadings ($< .52$) and high modification indices (> 17.46) resulted in a model that provided a much better fit of the data, $\chi^2(19, N=471) = 75.33, p < .001$, with fit indices largely exceeding .98 (CFI, NNFI, and GFI), and an RMSEA of .08. Therefore, the model with eight items was preferred as the model that best fitted the data indicating that the conflict measure can be characterized by two underlying factors representing task conflict ($\alpha = .74$) and relationship conflict ($\alpha = .80$). An example item of the relationship conflict scale is "In the lead up to the making of important decisions there was tension among the members of our team". An example of an item of the task conflict scale is "In the lead up to the making of important decisions there were differences of opinion in our team".

Team learning. We measured team learning using 26 items from the team learning scale developed by van Offenberg (2001). The overall reliability of this overall team learning scale was high ($\alpha = .97$). Since the team learning scale as developed by van Offenberg (2001) was designed to measure five types of learning activities (information acquisition, information distribution, convergent sensemaking, divergent sensemaking, and information storage and retrieval) we used Confirmatory Factor Analysis to test the underlying component structure. In the first model all 26 items of the team learning measure loaded on one factor. The results revealed that the one-factor model did not account well for the data, $\chi^2(306, N=471) = 2946.50, p < .001$ (GFI = .68, NNFI = .71, RMSEA = .12, CFI = .73). In a second model, the five-factor structure was tested with the five factors representing the five learning activities. However, the five-factor model also did not fit the data well, $\chi^2(289, N=471) = 1793.20$ (NNFI, CFI, and GFI indices were $< .90$, and RMSEA was $> .08$). Next, we tested a four-factor model, adding convergent and divergent sensemaking in one factor called information interpretation (Model 4); however, this model also did not lead to a satisfactory model fit (NNFI, CFI, and GFI indices were $< .90$, and RMSEA was $> .11$).

Because of the unsatisfactory results of the CFA, and because van Offenberg's instrument for team learning activities is a relatively new instrument, tested in a small student sample, we decided to conduct an exploratory Principal Component Analysis with oblique rotation on all team learning items. This analysis showed a three-factor model, explaining 67% of the variance. The factor solution was clear and interpretable and we decided to use the three factors as input for new scales. The cutoff point for considering an item for a scale was set at a component loading higher than .60. The cross-loadings were all lower than .27. The first component consisted of nine items measuring information distribution and information interpretation, and was called information processing ($\alpha = .94$). The second component consisted of six items

measuring information storage and retrieval ($\alpha = .92$) and the third component consisted of three items measuring information acquisition ($\alpha = .91$). Examples of items of the information acquisition scales are “In my team we retrieve information from outside the team by collaborating with others outside the team” and “In my team we search for professional information and knowledge outside the organization”. Examples of items of the information processing scale are “In my team members help each other to make sense of information”, and “In my team we challenge each other to take new perspectives concerning our work”. Examples of items of the information storage and retrieval scale are “In my team reports are made of team meetings” and “My team refers to documents made previously”.

In a second-order PCA on the variables information acquisition, information processing, and information storage and retrieval we found one underlying component (Eigenvalue 2.51, Eigenvalues second component 0.55 Eigenvalue third component 0.19) that explained more than 75% of the variance. We used the overall team learning scale to test our hypotheses and the underlying scales information acquisition, information processing, and information storage and retrieval for more exploratory analyses.

Perceived team performance. We used the 5-item scale developed by Edmondson (1999) to measure perceived team performance. As the CFA analysis showed a satisfactory fit, $\chi^2(5, N = 471) = 9.42, p < .001$ (GFI = .99, NNFI = .99, RMSEA = .04, CFI = .99), all items could be retained resulting in an alpha of .68. Team performance was evaluated with a response scale ranging from 1 (“strongly disagree”) to 7 (“strongly agree”). As four of the items of the scale measured the extent to which the team is not performing well (e.g., “Critical quality errors occur frequently in this team”), we recoded these items to facilitate interpretation in further analysis.

Control variables. Respondents were asked to indicate their age, gender, educational level (primary school = 1, junior secondary education = 2, senior secondary education = 3, professional education = 4, and university = 5), and team tenure (in years). Team size (number of team members) was reported by the team management. In our analyses, we controlled for team size, gender ratio (proportion of female team members), average level of education, average team tenure, and team type (healthcare teams vs. non-healthcare teams).

Analysis

Since our theoretical concepts were all on the team level, we aggregated our data to the team level by taking the mean value of the team members' scores. For perceived team performance, the intraclass correlation (the proportion

of the total amount of variance in the data that is between the teams; ICC1) was .17, which implies that 17% of the total variance in employee ratings of their team's performance was variance between the teams. ICC1 for task conflict and relationship conflict was .15 and .22, respectively. The ICC1 for team learning was .62 and between .40 and .59 for the underlying team learning activities. ICC2, representing the reliability of the group means (Bliese, 2000), was acceptable for team performance, task conflict, and relationship conflict (with .58, .55, and .66, respectively) and satisfactory for learning with .92 and the learning activities (between .83 and .91). Although the average within-group agreement (*Rwg*; James, Demaree, & Wolf, 1984) for relationship conflict and information acquisition was low (.65 and .54, respectively) it was acceptable for team learning (.84), information processing (.78), information storage and retrieval (.74), team performance (.70), and task conflict (.74).

We tested our hypotheses in hierarchical multiple regression models, using one-tailed tests. To test the mediating role of team learning three sets of analyses were conducted according to the procedure of Baron and Kenny (1986). First, we predicted the mediator (team learning) from the independent variables (task and relationship conflict; Table 2). Second, we predicted the dependent variable (perceived team performance) from the mediator (team learning; Table 3). Third, the dependent variable (perceived team performance) was regressed by the independent and mediating variables (task and relationship conflict and team learning; Table 4). Mediation is supported if the coefficients of the independent variables task

TABLE 2
Results of regression analyses predicting team learning from task- and relationship conflict

	Step 1 β	Step 2 β
Control variables:		
Gender ratio ^a	.02	.06
Average educational level	.05	.08
Team size	-.17*	-.09
Team type ^b	.75***	.59***
Predictors:		
Task conflict		.07
Relation conflict		-.38***
R^2	.57	.67
ΔR^2		.10***
F test	(4, 79) 26.04***	(6, 77) 26.38***

*** $p < .001$, ** $p < .01$, * $p < .05$, # $p < .10$. $N = 84$ teams. ^a0 = all male, 1 = all female.
^b1 = healthcare teams, 0 = other teams.

TABLE 3
Results of regression analyses predicting perceived team performance from team learning

	Step 1	Step 2
	β	β
Control variables		
Gender ratio ^a	.01	.01
Average educational level	-.06	-.09
Team size	-.34**	-.23*
Team type ^b	.22	-.29 [#]
Predictor:		
Team learning		.69***
R^2	.13	.33
ΔR^2		.20***
F test	(4, 79) 2.84*	(5, 78) 7.68***

*** $p < .001$, ** $p < .01$, * $p < .05$. $N = 84$ teams. ^a0 = all male, 1 = all female. ^b1 = healthcare teams, 0 = other teams.

TABLE 4
Results of regression analyses predicting perceived team performance from conflict, mediated by learning

	Step 1	Step 2a	Step 2b	Step 3
	B	β	β	β
Control variables:				
Gender ratio ^a	.01	.01	.02	-.01
Average educational level	-.06	-.05	-.04	-.09
Team size	-.34**	-.31**	-.29**	-.23*
Team type ^b	.22	.20	.12	-.29 [#]
Predictors:				
Task conflict		-.18*		
Relation conflict			-.24*	-.01
Team learning				.68***
R^2	.13	.16	.18	.33
ΔR^2		.03 [#]	.05*	.15***
F test	(4, 79) 2.84*	(5, 78) 2.90*	(5, 78) 3.33**	(6, 77) 6.32***
Sobel test for mediation				$Z = 3.11$ ***

*** $p < .001$, ** $p < .01$, * $p < .05$. $N = 471$ individuals, 84 teams, 38 organizations. ^a0 = male, 1 = female. ^b1 = healthcare teams, 0 = other teams.

and relationship conflict on perceived team performance decrease significantly when team learning is entered in the equation. The Sobel test for mediation was also reported (Krull & MacKinnon, 2001).

To test for multicollinearity the variance inflation factors (VIF) were calculated (Belsley, Kuh, & Welsch, 1980). All "VIF" values were below 2.2, indicating that multicollinearity was not a problem in the analyses.

RESULTS

Table 1 reports the correlations between the independent, mediating, dependent, and control variables (team level). Average age and average team tenure (years in team) did not relate to any of the independent, mediating, or dependent variables. Team learning was significantly related to the proportion of women in the team (gender ratio), $r = .49$, $p < .01$, and to average level of education, $r = .22$, $p < .05$. Team size was significantly related to team performance, $r = -.29$, $p < .01$. Therefore, we controlled for gender ratio, average level of education, and team size in subsequent analyses.

Next, we studied whether the different types of organizations differed from each other on the independent, mediating, and dependent variables. A MANOVA with type of organization as independent variable and task and relationship conflict, team learning, and perceived team performance as dependent variables revealed that there were no team differences between organizations on task conflict and perceived team performance, $F(5, 84) = 0.87$ and 0.43 , *ns*, respectively. However, the organizations differed in relationship conflict, $F(5, 84) = 2.42$, $p < .04$, and team learning, $F(5, 84) = 18.61$, $p < .001$. Post hoc contrasts between teams of the different types of organizations were not significant for relationship conflict. For team learning, however, it was the healthcare teams that learned significantly more than all other teams. Consequently, in subsequent models we controlled for the impact of type of organization (healthcare or non-healthcare).

In line with many other studies (De Dreu & Weingart, 2003; van der Vegt & Bunderson, 2005), task and relationship conflict correlated considerably, $r = .55$, $p < .01$. To study the unique contributions that task and relationship conflict may have on team learning we therefore chose to enter both task and relationship conflict simultaneously in the models testing Hypotheses 1 and 2.

We tested the first two hypotheses concerning the impact of task and relationship conflict on team learning simultaneously in a hierarchical multiple regression model (see Table 2). In Step 1 we predicted team learning from the control variables gender ratio, average level of education, team size, and type of organization. In Step 2 we added task conflict and relationship conflict as predictors of team learning. Clearly, Step 2 shows a significant improvement in explained variance (R^2). There is no significant relationship between task conflict and team learning, $\beta = .07$, *ns*. Relationship conflict is negatively related to team learning, $\beta = -.38$, $p < .001$. Thus, we found no support for Hypothesis 1, predicting a positive relationship between task

conflict and team learning, and full support for Hypothesis 2, predicting a negative relationship between relationship conflict and team learning.

As can be seen in Table 3, Hypothesis 3, predicting a positive relation between team learning and perceived team performance, was also supported, $\beta = .69$, $p < .001$. Table 4 shows the results concerning the direct relationship between task and relationship conflict and performance (Hypothesis 4a and b) and the results for the mediation by team learning (Hypothesis 5a and b). Task conflict is negatively related to perceived team performance, $\beta = -.18$, $p < .05$ (Hypothesis 4a corroborated, Table 4, Step 2a).³ Since task conflict was not related to team learning, Hypothesis 5a (the relationship between task conflict and team performance is partially mediated by team learning) was rejected.

As expected (Hypothesis 4b), relationship conflict is negatively related to team performance, $\beta = -.24$, $p < .05$ (Table 4, Step 2b). Furthermore, the relation between relationship conflict and perceived team performance (Hypothesis 5b) is mediated by team learning, as is evidenced by the decrease in the β coefficient of relationship conflict when team learning is added as an independent variable, and the Sobel test for mediation (Table 4, Step 3). As can be seen, relationship conflict is no longer related to perceived team performance when team learning is included in the model, showing that the relationship between relationship conflict and performance is fully mediated by team learning (see Figure 2). Therefore, Hypothesis 5b (predicting team learning to *partially* mediate the relationship between relationship conflict and team performance) was not supported, although the results do show that team learning *fully* mediates the relationship between relationship conflict and team performance.

Results exploratory analysis

In additional exploratory analyses, we investigated how task and relationship conflict were related to the underlying aspects of team learning. The analyses (reported in Table 5) show that the more relationship conflict team members experience, the less information acquisition, ($\beta = -.35$, $p < .01$, information processing, ($\beta = -.39$, $p < .001$, and information storage and retrieval, ($\beta = -.31$, $p < .001$, takes place. Task conflict is not significantly related to any of the underlying aspects of team learning.

³We also explored whether the relationships between task conflict and perceived team performance is curvilinear as suggested by research from De Dreu (2006). We followed De Dreu's procedure of adding the squared term for task conflict in a next step into the analysis (see also Footnote 2). No evidence was found for a curvilinear relationship. The model with the additional squared term showed no improvement of fit to Step 2a in Table 4 (R^2 change = .004, *ns*).

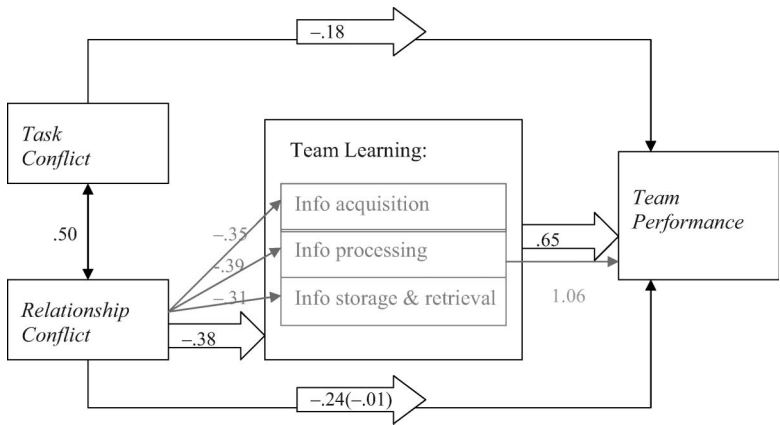


Figure 2. Empirical results regarding the conceptual model. All arrows represent significant findings. Black arrows represent relations with overall team learning; grey arrows represent relations with the three team learning activities.

TABLE 5
Results of exploratory regression analyses predicting team learning activities (information acquisition, information processing and information storage and retrieval) from task- and relationship conflict

	Information acquisition		Information processing		Storage and retrieval	
	Step 1 β	Step 2 β	Step 1 β	Step 2 β	Step 1 β	Step 2 β
Control variables:						
Gender ratio ^a	.17	.14	.05	.09	.07	.09
Average educational level	.13	.15	-.02	.01	.06	.08
Team size	.17	.11	-.21**	-.14 [#]	-.06	-.03
Team type ^b	.56***	.43**	.74***	.58***	.72***	.60***
Predictors:						
Task conflict		.12		.06		.07
Relation conflict		-.35**		-.39***		-.31***
R^2	.25	.33	.56	.66	.59	.66
ΔR^2		.08*		.11***		.06**
F test	(4, 79) 6.74***	(6, 77) 6.33***	(4, 79) 24.77***	(6, 77) 25.39***	(4, 79) 28.64***	(6, 77) 24.43***

*** $p < .001$, ** $p < .01$, * $p < .05$, [#] $p < .10$. $N = 471$ individuals, 84 teams, 38 organizations.
^a0 = male, 1 = female. ^b1 = healthcare teams, 0 = other teams.

Furthermore, we explored to what extent the different learning activities related to performance. First, we analysed the relationships between the three learning activities and team performance separately (Table 6, Steps 2, 3, and 4). Although the three learning activities are strongly correlated, we also analysed the three team learning activities together in a single analysis to study which of the team learning aspects has the strongest unique contribution to the prediction of perceived team performance ratings (Step 5, Table 6). The results show that although information acquisition and information storage and retrieval separately do relate to perceived team performance, ($\beta = .29$, $p < .05$, and ($\beta = .52$, $p < .001$, respectively in the model with all three learning activities these relationships disappear, whereas information processing is still related to team performance, ($\beta = 1.06$ $p < .001$. Apparently, it is especially team information processing that contributes to the positive relationship between team learning and perceived team performance.

As can be seen from Step 2, 3, and 4 and the Sobel test in Table 7, the relation between relationship conflict and perceived team performance is

TABLE 6
Results of regression analyses predicting perceived team performance from team learning activities (information acquisition, information processing and information storage and retrieval)

	Step 1 β	Step 2 β	Step 3 β	Step 4 β	Step 5 β
Control variables:					
Gender ratio ^a	.00	.06	-.04	-.03	-.05
Average educational level	-.06	-.09	-.04	-.08	.01
Team size	-.34**	-.29**	-.19 [#]	-.13**	-.16
Team type ^b	.22	.06	-.33*	-.15	-.29 [#]
Predictors:					
Information acquisition		.29*			.12
Information processing			.75***		1.06***
Information storage & retrieval				.52***	-.29
R^2	.13	.19	.37	.24	.39
ΔR^2		.06**	.25***	.11**	.27***
F test	(4, 79) 2.84*	(5, 78) 3.65**	(5, 78) 9.27***	(5, 78) 4.81**	(7, 76) 6.97***

*** $p < .001$, ** $p < .01$, * $p < .05$. $N = 471$ individuals, 84 teams, 38 organizations. ^a0 = male, 1 = female. ^b1 = healthcare teams, 0 = other teams.

TABLE 7

Results of regression analyses predicting perceived team performance from conflict, mediated by team learning activities (information acquisition, information processing, storage and retrieval)

	Step 1 β	Step 2 β	Step 3 β	Step 4 β
Control variables:				
Gender ratio ^a	.02	.06	-.04	-.02
Average educational level	-.04	-.07	-.04	-.07
Team size	-.29**	-.26*	-.18 [#]	-.29**
Team type ^b	.12	.01	.33*	-.16
Predictors:				
Relation conflict	-.24*	-.18	.03	-.12
Information acquisition		.24 [#]		
Information processing			.76***	
Information storage & retrieval				.45**
R^2	.18	.21	.37	.25
ΔR^2		.04 [#]	.20***	.07**
F test	(5, 78) 3.33**	(6, 77) 3.49**	(6, 77) 7.64***	(6, 77) 4.20**
Sobel test		1.61 [#]	3.35***	2.15*

*** $p < .001$, ** $p < .01$, * $p < .05$, [#] $p < .10$. $N = 471$ individuals, 84 teams, 38 organizations.
^a0 = male, 1 = female. ^b1 = healthcare teams, 0 = other teams.

mediated by all learning activities, but most strongly by information processing.

DISCUSSION

As teams have to learn in order to successfully adapt to their changing environment, it is important to know what antecedents precede team learning and team performance. Few studies up to now have examined the process of team learning and the supposed relationship between conflicts and team learning. In this study, we investigated the relationships between task and relationship conflicts in teams on the one hand and team learning and perceived team performance on the other hand. Where some of the studies that did examine the relationship between learning and team performance used student teams, this study used a large data set of individuals working in “real” work teams in a diversity of sectors.

Our results are not in line with authors who report a positive effect of task conflict on group processes like team learning (Ellis et al., 2003; Kasl, Marsick, & Dechant, 1997; van Offenbeek, 2001). The relationship between task conflict and team learning (and its underlying activities) was not significant. Possibly task conflict is difficult to separate from relationship

conflict as is also evident from the strong correlation between the two types of conflict. It is likely that task conflict, just as relationship conflict, leads to an increase in cognitive load that disrupts the learning process. The potential positive relationship between task conflict and team learning might be neutralized by the need for convergence of information. Confirming our hypothesis, there was a negative relationship between task conflict and performance.

The detrimental relationship between relationship conflict and the ability of the team to learn was confirmed in our study, both for the general team learning measure and for the three team learning activities. Relationship conflict was also negatively related to ratings of team performance and this relationship was fully mediated by team learning.

As hypothesized, our study showed that the extent to which teams are able to learn is strongly related to the team's (perceived) performance. Overall team learning, and all three team learning activities, when studied separately, were positively related to the team ratings of performance. However, when looking at the unique contribution of the three team learning activities to perceived team performance, we found that it was only team information processing, the extent to which team members exchange information with each other and are able to make sense of this information that was positively related to perceived team performance. From research on "shared mental models" (Cannon-Bowers & Salas, 2001; Klimoski & Mohammed, 1994), it can be argued that developing a shared understanding of the work (as a part of information processing), is indeed important for teams to perform well. As for the nonsignificant relationship between information acquisition and performance, it is likely that although on the one hand information acquisition is beneficial for team learning, on the other hand information acquisition may harm performance as the team may face information overload and may find integration of too many aspects concerning a task difficult. As for the nonsignificant relationship between information storage and retrieval and performance, this may be because teams that process information effectively, may store information in their collective mind. The physical storage of information in minutes, documents, and archives (what the instruments measure) may then be of less importance. Our results regarding the importance of different learning activities in relation to team performance are salient, as van Offenbeek (2001) found exactly the opposite (only significant effects for information storage and retrieval and information acquisition on perceived team performance). These differences may be explained by the difference in type of team. Whereas van Offenbeek studied short-term project teams of students, we studied long-term work teams. In student teams division of labour on an assignment is often common, i.e., the assignment is often split up between the members in separate tasks with the aim of reducing the need

to meet and cooperate with each other. Thus, in such situations information distribution and especially information interpretation aspects of team learning are limited, whereas information acquisition and information storage and retrieval become more crucial. In work teams, on the other hand, consisting of team members who work together on a day-to-day basis, it is especially the process of sharing and interpreting information that is beneficial for team performance, whereas the more concrete activities of information acquisition and information storage and retrieval may be of less importance.

An unexpected finding in our study was the strong impact of team type on team learning. Teams in the health care learned more than all other teams. Possibly, the urgency for team learning in healthcare teams is bigger in the light of the fast rate of knowledge development in medical science (Tucker, Nembhard, & Edmondson, 2007). Moreover, the need for knowledge exchange and learning can be crucial for the quality of patient care, especially in the light of the high degree of task interdependency in healthcare teams

Implications for practice

De Dreu (2006) suggests that team managers and organizational leaders should stimulate moderate levels of task conflict in their work teams, but our data does not support this suggestion. Our results suggest that team leaders should invest their energy in establishing good interpersonal relationships within the team in order to prevent both task and relationship conflicts. Moreover, the most important practical implication of our study is that team managers and organizational leaders should stimulate team learning as this has a major influence on (perceived) team performance. As it is especially information processing that is beneficial for team performance, teams should be encouraged to make time for sharing and interpreting information in team meetings. Furthermore, as team size showed to be negatively related to both team learning and team performance, managers should also be careful not to make teams larger than necessary.

Limitations and implications for future research

Obviously our data are cross-sectional in nature. Hence, on the basis of this study we cannot draw conclusion about the causality between our variables. Longitudinal designs that study the sequence of types of conflict and team learning activities are called for. Moreover, future research explaining team learning should not only look at the existence of conflicts, but also at the way teams deal with and manage conflicts (De Reuver, 2006; Shaw & Barrett-Power, 1998). Perhaps it is not task conflict, but constructive

conflict, the efforts of the team members to deal constructively with their experienced differences in viewpoints (van den Bossche, 2006), that is related to team learning.

A next restraint of our study is our self-reported performance measure. Apart from the possible percept–percept bias, the content of this measure is limited to the satisfaction of team members with the team performance. Future studies should therefore include more objective performance measures.

Importantly, our results must be interpreted with caution since we had to use modified versions of both Jehn's intragroup conflict scales (1994) and van Offenbeek's team learning scales (2001). Although we intended to measure five team learning activities with the instrument developed by van Offenbeek (2001), confirmatory factor analysis failed to find these five factors. We did find evidence for three team learning activities, namely information acquisition, information processing, and information storage and retrieval. The information distribution and information interpretation activities were merged in the dimension of information processing. It is likely that in work teams (in contrast to short-term student teams) these activities take place simultaneously in team meetings or are integrated in the daily routine, which makes it hard for respondents to separate between them. More research is necessary to distinguish between different learning activities and to find out whether different learning activities are effective in different phases of task accomplishment. In-depth understanding of team learning may help both team members and organizations to improve their performance.

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